Exhibit 300 (BY2010)

PART ONE	
OVERVIEW	
1. Date of Submission:	2008-09-08
2. Agency:	026
3. Bureau:	00
4. Name of this Capital Asset:	ARC Shared Capabilities Assets Program (SCAP) HECC
5. Unique Project Identifier:	026-00-01-04-01-1124-00

6. What kind of investment will this be in FY2010?
Mixed Life Cycle

7. What was the first budget year this investment was submitted to OMB?
FY2004

8. Provide a brief summary and justification for this investment, including a brief description of how this closes in part or in whole an identified agency performance gap.
On January 14, 2004, President Bush established a new vision for space exploration, which encompasses a broad range of human/robotic missions to the Moon, Mars, and beyond. In response to the president's vision, NASA has established six strategic goals, including the following specific to HECC. - Fly the Shuttle as safely as possible until its retirement (Goal #1) - Develop a balanced overall program of science, exploration, and aeronautics (Goal #3) - Bring a new Crew Exploration Vehicle into service as soon as possible (Goal #4) To accomplish these goals, NASA must develop an in-depth and quantitative understanding of very complex engineering, physical, and biological systems. When physical experimentation is not feasible, theoretical/numerical analysis must be employed. In many cases, the theory governing fluid dynamics, thermodynamics, chemistry, materials, and many biological processes are coupled with non-linear partial differential equations not amenable to simple analytical solutions. Typically, these equations need to be discretized in multiple independent variables resulting in very large iterative matrix operations. As a result, developing highly accurate solutions to these equations often involves the need to perform trillions of computations. Since these computations must often be performed within the time constraints of ongoing development activities (for example, space vehicle analysis), these computational results are typically needed in hours or, at most, a few days. To deliver the benefit of such computational modeling and simulation, it is essential to have a high-end computing and communications system configured to meet the specific requirements of the NASA exploration community. This system must include sufficient and appropriate computing and communication assets, as well as the software to support the optimization and execution of the computational code and post-processing of the computational results. HECC provides a 245 + teraflop computing asset, together with services to support application porting and scaling, data storage, pre- and post-processing, visualization, training, and online/help desk support. NASA users across the nation can use HECC to accelerate the development of innovative technologies, ensure new scientific discoveries, develop complex engineering systems, and reduce risks in support of NASA missions.

9. Did the Agency's Executive/Investment Committee approve this request?
yes

9.a. If "yes," what was the date of this approval?
2008-06-19

10. Did the Program/Project Manager review this Exhibit?
yes

11. Program/Project Manager Name:
Rupak Biswas

Program/Project Manager Phone:
650 604-4411

Program/Project Manager Email:
Rupak.Biswas@nasa.gov

11.a. What is the current FAC-P/PM certification level of the project/program manager?

Senior/Expert/DAWIA-Level 3	
11.b. When was the Program/Project Manager Assigned?	
2005-04-15	
11.c. What date did the Program/Project Manager receive the FACP/PM certification? If the certification has not been issued, what is the anticipated date for certification?	
2008-08-08	
12. Has the agency developed and/or promoted cost effective, energy-efficient and environmentally sustainable techniques or practices for this project.	
yes	
12.a. Will this investment include electronic assets (including computers)?	
yes	
12.b. Is this investment for new construction or major retrofit of a Federal building or facility? (answer applicable to non-IT assets only)	
no	
13. Does this investment directly support one of the PMA initiatives?	
yes	
If yes, select the initiatives that apply:	
R and D Investment Criteria	
13.a. Briefly and specifically describe for each selected how this asset directly supports the identified initiative(s)? (e.g. If E-Gov is selected, is it an approved shared service provider or the managing partner?)	
The High End Computing Columbia (HECC) Project provides an integrated environment that includes high-speed access to cutting edge High End Computing (HEC) platforms, assistance with application porting and scaling, data storage, pre- and post-processing support, visualization, training and online and help desk support. These capabilities enable NASA to do the necessary research and engineering work to accomplish its missions; for example, designing the next space vehicle mission concepts.	
14. Does this investment support a program assessed using the Program Assessment Rating Tool (PART)?	
yes	
14.a. If yes, does this investment address a weakness found during the PART review?	
no	
14.b. If yes, what is the name of the PARTed program?	
10004392 - NASA Earth-Sun System Research	
14.c. If yes, what rating did the PART receive?	
Moderately Effective	
15. Is this investment for information technology?	
yes	
16. What is the level of the IT Project (per CIO Council's PM Guidance)?	
Level 2	
17. What project management qualifications does the Project Manager have? (per CIO Council's PM Guidance)	
(1) Project manager has been validated as qualified for this investment	
18. Is this investment identified as high risk on the Q4 - FY 2008 agency high risk report (per OMB memorandum M-05-23)?	
no	
19. Is this a financial management system?	
no	
19.a.1. If yes, which compliance area:	
No Value	
19.a.2. If no, what does it address?	
No Value	

19.b. If yes, please identify the system name(s) and system acronym(s) as reported in the most recent financial systems inventory update required by Circular A11 section 52.	
No Value	
20. What is the percentage breakout for the total FY2010 funding request for the following? (This should total 100%)	
Hardware	41
Software	1
Services	32
Other	26
21. If this project produces information dissemination products for the public, are these products published to the Internet in conformance with OMB Memorandum 05-04 and included in your agency inventory, schedules and priorities?	
yes	
22. Contact information of individual responsible for privacy related questions.	
Name	
Arsi Vaziri	
Phone Number	
(650)604-4523	
Title	
Computer Security Officer	
Email	
Arsi.Vaziri@nasa.gov	
23. Are the records produced by this investment appropriately scheduled with the National Archives and Records Administration's approval?	
yes	
24. Does this investment directly support one of the GAO High Risk Areas?	
no	

SUMMARY OF SPEND

1. Provide the total estimated life-cycle cost for this investment by completing the following table. All amounts represent budget authority in millions, and are rounded to three decimal places. Federal personnel costs should be included only in the row designated Government FTE Cost, and should be excluded from the amounts shown for Planning, Full Acquisition, and Operation/Maintenance. The total estimated annual cost of the investment is the sum of costs for Planning, Full Acquisition, and Operation/Maintenance. For Federal buildings and facilities, life-cycle costs should include long term energy, environmental, decommissioning, and/or restoration costs. The costs associated with the entire life-cycle of the investment should be included in this report.

All amounts represent Budget Authority

(Estimates for BY+1 and beyond are for planning purposes only and do not represent budget decisions)

	PY-1 & Earlier	PY	CY	BY
	-2007	**2008**	**2009**	**2010**
Planning Budgetary Resources	0	0	0	0
Acquisition Budgetary Resources	84.704	25.416	26.049	27.458
Maintenance Budgetary Resources	43.292	8.11	8.186	8.647
Government FTE Cost	17.788	4.304	4.537	4.764
# of FTEs	88	23	25	25

2. Will this project require the agency to hire additional FTE's?

no

3. If the summary of spending has changed from the FY2009 President's budget request, briefly explain those changes.

Some funds planned in BY2009 were removed and corresponding actions are no longer required.

PERFORMANCE

In order to successfully address this area of the exhibit 300, performance goals must be provided for the agency and be linked to the annual performance plan. The investment must discuss the agency's mission and strategic goals, and performance measures (indicators) must be provided. These goals need to map to the gap in the agency's strategic goals and objectives this investment is designed to fill. They are the internal and external performance benefits this investment is expected to deliver to the agency (e.g., improve efficiency by 60 percent, increase citizen participation by 300 percent a year to achieve an overall citizen participation rate of 75 percent by FY 2xxx, etc.). The goals must be clearly measurable investment outcomes, and if applicable, investment outputs. They do not include the completion date of the module, milestones, or investment, or general goals, such as, significant, better, improved that do not have a quantitative measure.

Agencies must use the following table to report performance goals and measures for the major investment and use the Federal Enterprise Architecture (FEA) Performance Reference Model (PRM). Map all Measurement Indicators to the corresponding Measurement Area and Measurement Grouping identified in the PRM. There should be at least one Measurement Indicator for each of the four different Measurement Areas (for each fiscal year). The PRM is available at www.egov.gov. The table can be extended to include performance measures for years beyond the next President's Budget.

	Fiscal Year	Strategic Goal Supported	Measurement Area	Measurement Grouping	Measurement Indicator	Baseline	Planned Improvement to the Baseline	Actual Results
1	2009	Goal 1: Fly the Shuttle as safely as possible until its retirement, not later than 2010.	Mission and Business Results	Space Operations	Facilities, Fleet, And Equipment Management	99% uptime generating 6MW of electrical power via diesel generators and Rotary Uninterrupted Power Supply (RUPS)	N258 - 99% uptime generating 8MW of electrical power via diesel generators and RUPS	TBD
2	2009	Goal 3: Develop a balanced overall program of science, exploration and aeronautics.	Mission and Business Results	Scientific and Technological Research and Innovation	IT Infrastructure Maintenance	Maintain servers and desktops in standard OS X and Linux configurations, upgrade to latest operating systems and 100% compliance with the IT Security Plan	Maintain servers and desktops in standard OS X and Linux configurations, upgrade to latest operating systems and 100% compliance with the IT Security Plan	TBD
3	2009	Goal 4: Bring a new Crew Exploration Vehicle into service as soon as possible after Shuttle retirement.	Mission and Business Results	Space Exploration and Innovation	Official Information Dissemination, Product Outreach	Update NAS web site and continue to maintain 100% compliance with NASA policies for public websites and publications	Update NAS web site and continue to maintain 100% compliance with NASA policies for public websites and publications	TBD
4	2009	Goal 1: Fly the Shuttle as safely as possible until its retirement, not later than 2010.	Mission and Business Results	Space Operations	Security Policies, and Plans	Continue to maintain 100% compliance with security policies, update system and facility security plans, and maintain 24-hour response capability	Continue to maintain 100% compliance with security policies, update system and facility security plans, and maintain 24-hour response capability	TBD

						and timely solution to security incidents	and timely solution to security incidents	
5	2009	Goal 3: Develop a balanced overall program of science, exploration and aeronautics.	Mission and Business Results	Scientific and Technological Research and Innovation	Ability to support HEC requirements needed to accomplish NASA's strategic goals #1, #3 & #4	Continue to meet prioritized computing demand on Columbia in support of ESMD, ARMD, SMD and SOMD	Continue to meet prioritized computing demand on Columbia in support of ESMD, ARMD, SMD and SOMD	TBD
6	2009	Goal 4: Bring a new Crew Exploration Vehicle into service as soon as possible after Shuttle retirement.	Mission and Business Results	Space Exploration and Innovation	System Utilization	Mission Directorates use 100% of SCAP allotments of computer time if demand is sufficient.	Mission Directorates use 100% of SCAP allotments of computer time if demand is sufficient.	TBD
7	2009	Goal 1: Fly the Shuttle as safely as possible until its retirement, not later than 2010.	Customer Results	Service Efficiency	Staffing and Response of Control Room	Continue 100% shifts staffed 24x7, timely resolution of level 1 system and user problems	Continue 100% shifts staffed 24x7, timely resolution of level 1 system and user problems	TBD
8	2009	Goal 3: Develop a balanced overall program of science, exploration and aeronautics.	Customer Results	Access	Availability - System Availability	90%	90%	TBD
9	2009	Goal 4: Bring a new Crew Exploration Vehicle into service as soon as possible after Shuttle retirement.	Technology	Service Availability	Reliability - System MTBF (Mean Time Between Failures)	New System	14 Days MTBF on 512-processor systems	TBD
10	2009	Goal 1: Fly the Shuttle as safely as possible until its retirement, not later than 2010.	Technology	Data Storage	Storage capacity and access speed	Operate a 7-Petabyte storage system, and archive a maximum of 38 Terabyte (TB) per day and retrieve a maximum of 13 TB of data per day	Identify next-generation tape and archive storage system	TBD
11	2009	Goal 3: Develop a balanced	Technology	Technology Improvement	System Development	Acquire new capability to enhance peak	Acquire new capability to enhance peak	TBD

		overall program of science, exploration and aeronautics.				capability to approximately 137 Teraflops (TF)	capabilit to approximately 383 TF	
12	2009	Goal 4: Bring a new Crew Exploration Vehicle into service as soon as possible after Shuttle retirement.	Customer Results	Customer Satisfaction	Number of users provided significant porting and optimization assistance	Current ability to provide scientific consulting assistance, including significant porting and optimization assistance to > 25 users	Provide significant porting and scaling help to at least 30 users	TBD
13	2009	Goal 1: Fly the Shuttle as safely as possible until its retirement, not later than 2010.	Processes and Activities	Efficiency	Reduced time to solution	Current performance of selected applications	Increased performance beyond speed-up due to hardware alone for at least 3 applications	TBD
14	2009	Goal 3: Develop a balanced overall program of science, exploration and aeronautics.	Technology	IT Contribution to Process, Customer, or Mission	Ability to support demands for visualization of simulation results	Newly updated rendering and display facility (hyperwall-2, 8x16 displays, 250 million pixels)	Use current hardware; port and develop applications to take advantage of updated rendering environment and improved integration with primary computational resources	TBD
15	2009	Goal 4: Bring a new Crew Exploration Vehicle into service as soon as possible after Shuttle retirement.	Technology	Accessibility	Metric: % time to meet acceptable level of throughput	Multiple NASA Centers and external partners: 10 Gigabits per second (Gbs); LaRC, GSFC, MSFC; 1Gbs: JPL	Extend to all (+6) NASA Centers, but planned decrease in throughput to most NASA centers and external partners	TBD
16	2009	Goal 1: Fly the Shuttle as safely as possible until its retirement, not later than 2010.	Technology	Accessibility	No. of network ports connected to Columbia	Maintain ~1300 network ports to Columbia	Maintain ~1600 network port to Columbia and Pleiades	TBD
17	2009	Goal 3: Develop a balanced overall program of science, exploration and	Technology	Internal Data Sharing	Amount TeraBytes of data transferred from HEC resources	Maintain ~60 TB of data transferred from HEC resources	Maintain ~120 TB of data transferred from HEC resources	TBD

		aeronautics.					
18	2008	Goal 4: Bring a new Crew Exploration Vehicle into service as soon as possible after Shuttle retirement.	Mission and Business Results	Space Operations	Facilities, Fleet, And Equipment Management	Provide sufficient power and cooling for Columbia and an ergonomic/functional working environment for HECC staff	Provide sufficient power and cooling to accommodate "Columbia follow-on" and the ergonomic/functional working environment for HECC staff	Supplied 6MW to bldg N258 & upgraded computer room floor to 4MW; upgraded cooling capacity to 450 tons, air capacity to 60 tons; water cooling pumps upgraded to 2600 gallons per minute (GPM); computer room footprint expanded to 4000 ft2 & 6MW power
19	2008	Goal 1: Fly the Shuttle as safely as possible until its retirement, not later than 2010.	Mission and Business Results	Scientific and Technological Research and Innovation	IT Infrastructure Maintenance	Maintain servers and desktops in standard OS X and Linux configurations, running current OS's and in 100% compliance with the IT Security Plan	Maintain servers and desktops in standard OS X and Linux configurations, upgrade to latest OS's and 100% compliance with the IT Security Plan	Deploying & upgrading servers & desktops to Red Hat Enterprise Linux 5.2 & Apple OS X 10.5.3. All systems in compliance with NAS IT Security Plans & PatchLink requirements; use of Casper greatly reduced upgrade and patching time for OS X systems
20	2008	Goal 3: Develop a balanced overall program of science, exploration and aeronautics.	Mission and Business Results	Space Exploration and Innovation	Official Information Dissemination, Product Outreach	Maintain 100% compliance with NASA policies for public web sites and publications.	Update NAS web site and continue to maintain 100% compliance with NASA policies for public websites and publications	NAS website updated regularly, maintenance performed quarterly. NAS website and publications in 100% compliance with NASA policies
21	2008	Goal 4: Bring a new Crew Exploration Vehicle into service as soon as	Mission and Business Results	Space Operations	Security Policies, and Plans	Maintain 100% compliance with security policies, maintaining system and facility security plans	Continue to maintain 100% compliance with security policies, update system and facility security plans, and maintain 24-hour	Maintained 100% compliance with security policies and plans; maintained 24-

#	Year	Goal						
		possible after Shuttle retirement.					response capability and timely solution to security incidents.	hour response capability and timely solution to security incidents
22	2008	Goal 1: Fly the Shuttle as safely as possible until its retirement, not later than 2010.	Mission and Business Results	Scientific and Technological Research and Innovation	Ability to support HEC requirements needed to accomplish NASA's strategic goals #1, #3 & #4	Currently able to meet 100% of prioritized computing demands on Columbia in support of ESMD, ARMD, SMD and SOMD	Continue to meet 100% of prioritized computing demand on Columbia in support of ESMD, ARMD, SMD and SOMD	Provided special queues & procedures to prioritize computing needs to Mission Directorates; special help for time-critical computing needs during 4 shuttle missions; help for other priority work e.g. external tank redesign, flame trench analysis, etc
23	2008	Goal 3: Develop a balanced overall program of science, exploration and aeronautics.	Mission and Business Results	Space Exploration and Innovation	System Utilization	More than 75% of Mission Directorate allotments	Mission Directorates use 100% of SCAP allotments of computer time if demand is sufficient.	From 10/1/07 to 6/30/08, HECC delivered more than 100% of the combined SCAP allotments of computer time to Mission Directorates. Individual Mission Directorates using less than 100% of their individual allocations did not have sufficient demand.
24	2008	Goal 4: Bring a new Crew Exploration Vehicle into service as soon as possible after Shuttle retirement.	Customer Results	Service Efficiency	Staffing and Response of Control Room	Control room 100% staffed 24x7;100% response within 24 hrs to system and user problems	Continue 100% shifts staffed 24x7; 100% response to system and user problems	100% of Control Room shifts were staffed with 2-3 people 24x7. Over 1000 Level 1 problems were resolved each month, most within 4-24 hours. (More specific statistics coming by Oct. 1, 2008.)
25	2008	Goal 1: Fly	Customer	Access	Availability -	90%	90%	Gross

		the Shuttle as safely as possible until its retirement, not later than 2010.	Results		System Availability			availability (scheduled and unscheduled outages) for the production Columbia systems (excludes C22): 96.62%
26	2008	Goal 3: Develop a balanced overall program of science, exploration and aeronautics.	Technology	Service Availability	Reliability - System MTBF (Mean Time Between Failures)	14 Days MTBF	16 Days MTBF on 512-processor systems	From May, 1 2007 - April, 30 2008 (a one-year period), the MTBF on 512 processor systems averaged 16.81 days, meeting the required standard.
27	2008	Goal 4: Bring a new Crew Exploration Vehicle into service as soon as possible after Shuttle retirement.	Technology	Data Storage	Storage capacity and access speed	Operates a 4-Petabyte storate system, archives 8-TByte/day, retrieves 2-Tbyte/day	Operates a 6-Petabyte storage system, archives 11-TByte/day, retrieves 3-Tbyte/day	Operated a 7-Petabyte storage system, and archived an average of 15 TB per day, and retrieved an average of 3.5 TB per day.
28	2008	Goal 1: Fly the Shuttle as safely as possible until its retirement, not later than 2010.	Technology	Technology Improvement	System Development	Current production systems and evaluation system provide greater than 68 TFs peak power	Acquire new capability to enhance peak capability to approximately 90 TFs	A peak capability of 375.6 Teraflops will be available as of Sept. 2008. (Columbia: 89 TF, RTJones 4.1 TF, Schirra: 42.5 TF, Pleiades: 240 TF)
29	2008	Goal 3: Develop a balanced overall program of science, exploration and aeronautics.	Customer Results	Customer Satisfaction	Number of users provided significant porting and optimization assistance	Currently provide scientific consulting assistance, including significant porting and optimization assistance to > 20 users.	Provide significant porting and scaling help to at least 25 users.	Significant issues in porting and scaling resolved for at least 22 users.
30	2008	Goal 4: Bring a new Crew Exploration Vehicle into service as soon as possible after	Processes and Activities	Efficiency	Reduced time to solution	Current performance of selected applications	Increased performance beyond speed-up due to hardware alone for at least 3 applications.	Increased performance of at least 4 codes by more than 20%

		Shuttle retirement.					
31	2008	Goal 1: Fly the Shuttle as safely as possible until its retirement, not later than 2010.	Technology	IT Contribution to Process, Customer, or Mission	Ability to support demands for visualization of simulation results	A high-end rendering and display facility to support visualization demands with fast response time and high temporal resolution for selected applications	An improved rendering and display facility, coupled with extended application of visualization techniques to existent and new applications	Deployed quarter-billion-pixel rendering & display facility, with much improved capability & integration with computer & data storage systems; provided traditional post-processing and concurrent visualization support to existing and new applications
32	2008	Goal 3: Develop a balanced overall program of science, exploration and aeronautics.	Technology	Accessibility	Metric: % time to meet acceptable level of thruput	Multiple Centers: JPL (1), LaRC, GSFC, MSFC 10Mbit/sec	Planned decrease theoratical thruput to GSFC 2.5 Gbit/sec; achieve 1.947Gbit/sec & 141Mbit/sec actual 100% time	Planned decrease to NISN capabilities has not occurred yet; multiple centers: JPL (1), LaRC, GSFC, MSFC 10Megabits/sec
33	2008	Goal 1: Fly the Shuttle as safely as possible until its retirement, not later than 2010.	Technology	Accessibility	No. of network ports connected to Columbia	Maintain ~1200 network ports to Columbia	Maintain ~1300 network port to Columbia (and its follow-on)allotments during this transition year as the Columbia supercomputer is being upgraded	Maintained ~1300 network port to Columbia (and its follow-on)
34	2008	Goal 3: Develop a balanced overall program of science, exploration and aeronautics.	Technology	Internal Data Sharing	Enhanced file transfer techniques for users at GRC, LaRC, JSC, JPL	63% of data transfers using enhanced techniques`	70% of data transfers using enhanced techniques	70% of data transferred using enhanced techniques
35	2010	Goal 1: Fly the Shuttle as safely as possible until its retirement, not later than 2010.	Mission and Business Results	Information Security	Security Policies, and Plans	Continue to maintain 100% compliance with security policies, update system and facility security plans, and maintain 24-hour response capability and timely solution to security incidents	Continue to maintain 100% compliance with security policies, update system and facility security plans, and maintain 24-hour response capability and timely solution to security incidents	TBD
36	2010	Goal 3: Develop a	Technology	Technology Improvement	System Development	Acquire new capability to	Acquire new capability to	TBD

#	Year							
		balanced overall program of science, exploration and aeronautics.				enhance peak capabilit to approximately 383 TF	enhance peak capabilit to approximately 400 TF	
37	2010	Goal 4: Bring a new Crew Exploration Vehicle into service as soon as possible after Shuttle retirement.	Customer Results	Customer Satisfaction	Number of users provided significant porting and optimization assistance	Current ability to provide scientific consulting assistance, including significant porting and optimization assistance to > 25 users	Provide significant porting and scaling help to at least 30 users	TBD
38	2010	Goal 1: Fly the Shuttle as safely as possible until its retirement, not later than 2010.	Processes and Activities	Efficiency	Reduced time to solution	Current performance of selected applications	Increased performance beyond speed-up due to hardware alone for at least 3 applications	TBD

EA

In order to successfully address this area of the business case and capital asset plan you must ensure the investment is included in the agency's EA and Capital Planning and Investment Control (CPIC) process, and is mapped to and supports the FEA. You must also ensure the business case demonstrates the relationship between the investment and the business, performance, data, services, application, and technology layers of the agency's EA.

1. Is this investment included in your agency's target enterprise architecture?

yes

1.a. If no, please explain why?

Not Applicable

2. Is this investment included in the agency's EA Transition Strategy?

yes

2.a. If yes, provide the investment name as identified in the Transition Strategy provided in the agency's most recent annual EA Assessment.

ARC Shared Capability Asset Program (SCAP) HECC, formerly the ARC Shared Capability Asset Program (SCAP) HECC MPIT, formerly the ARC High End Computing Columbia (HECC)

2.b. If no, please explain why?

Not Applicable

3. Is this investment identified in a completed (contains a target architecture) and approved segment architecture?

yes

3.a. If yes, provide the six digit code corresponding to the agency segment architecture. The segment architecture codes are maintained by the agency Chief Architect.

326-000

4. Identify the service components funded by this major IT investment (e.g., knowledge management, content management, customer relationship management, etc.). Provide this information in the format of the following table. For detailed guidance regarding components, please refer to http://www.whitehouse.gov/omb/egov/.

Component: Use existing SRM Components or identify as NEW. A NEW component is one not already identified as a service component in the FEA SRM.

Reused Name and UPI: A reused component is one being funded by another investment, but being used by this investment. Rather than answer yes

or no, identify the reused service component funded by the other investment and identify the other investment using the Unique Project Identifier (UPI) code from the OMB Ex 300 or Ex 53 submission.

Internal or External Reuse?: Internal reuse is within an agency. For example, one agency within a department is reusing a service component provided by another agency within the same department. External reuse is one agency within a department reusing a service component provided by another agency in another department. A good example of this is an E-Gov initiative service being reused by multiple organizations across the federal government.

Funding Percentage: Please provide the percentage of the BY requested funding amount used for each service component listed in the table. If external, provide the funding level transferred to another agency to pay for the service.

	Agency Component Name	Agency Component Description	Service Type	Component	Reused Component Name	Reused UPI	Internal or External Reuse?	Funding %
1	Terascale Systems Group	Acquire, install and operate advanced computing systems and improving their operational characteristics to match the specific needs of the NASA user community as part of the NAS Technology Refresh (NTR)	Knowledge Discovery	Simulation			No Reuse	13
2	Terescale Systems Group	System Management: Day-to-day operational responsibilities that include activities such as on-going kernel upgrades, systems maintenance, patch management, and systems monitoring	Knowledge Discovery	Modeling			No Reuse	5
3	Terescale Systems Group	Provide a storage archive system	Knowledge Discovery	Data Mining			No Reuse	5
4	Terescale Systems Group	Evaluate the performance of current and future in-house and external architectures using benchmarks developed in-house, external benchmarks, and full NASA-relevant applications	Investment Management	Strategic Planning and Mgmt			No Reuse	5
5	Networking	Wide area network (WAN) - provide a wide area, high-speed network for large data distribution and real-time interactive applications	Communication	Computer / Telephony Integration			No Reuse	3
6	Networking	Columbia local area network (LAN) - provide networking support for the Columbia and Pleiades supercomputers	Knowledge Management	Information Sharing			No Reuse	3
7	Networking	End-to-End User Services - provide end-to-end customer support for remote Columbia and Pleiades supercomputer users	Knowledge Management	Information Sharing			No Reuse	3

8	Networking	Network Monitoring - provide network monitoring and data analysis for HEC data flows	Systems Management	System Resource Monitoring			No Reuse	3
9	User Services	Handle HECC users questions/problems 24 X 7 via telephone, web, or e-mail	Customer Initiated Assistance	Assistance Request			No Reuse	3
10	User Services	Support the retention and delivery of HECC capability	Customer Relationship Management	Customer / Account Management			No Reuse	3
11	User Services	Collect, analyze and handle comments and feedback	Customer Relationship Management	Customer Feedback			No Reuse	3
12	User Services	Provide a comprehensive view of all HECC users	Customer Relationship Management	Contact and Profile Management			No Reuse	3
13	User Services	Collect useful information from HECC users to help improve service	Customer Relationship Management	Surveys			No Reuse	3
14	User Services	Liaison w/NASA Mission Directorate representatives to support high priority computing requirements	Customer Initiated Assistance	Scheduling			No Reuse	3
15	User Services	Provide stakeholders the information and tools needed to evaluate and maximize the impact of HECC on mission success	Management of Processes	Requirements Management			No Reuse	3
16	Application Performance & Productivity	Scientific Consulting: Provide (Second tier, application-based) problem resolution for users including porting and scaling their codes on the current parallel architectures	Customer Initiated Assistance	Assistance Request			No Reuse	2
17	Application Performance & Productivity	Tool Assessment and Utilization: Evaluate and utilize tools and support software for optimizing the performance and productivity of users and their applications	Analysis and Statistics	Mathematical			No Reuse	2
18	Application Performance Productivity	Service Platform and Infrastructure	Analysis and Statistics	Mathematical			No Reuse	2
19	Project Office	Project Execution Oversight: maximize mission impact and minimize administrative burdens on technical leads	Management of Processes	Program / Project Management			No Reuse	2
20	Project Office	Execute, maintain, and periodically update Risk Management Plan in conjunction with vigilant monitoring of project	Management of Processes	Risk Management			No Reuse	2

		progress and changing customer/Agency requirements						
21	Project Office	Project Formulation, taking the following factors into consideration: HEC technical trends; current and evolving requirements of HECC stakeholders, customers, and users; and other NASA, federal government, private sector, and international high-performance computing and communications research and development activities	Investment Management	Strategic Planning and Mgmt			No Reuse	2
22	Facilities	Upgrade facility infrastructure (electrical and mechanical) required to house and sustain 10x the capacity of the current national computing asset as of the beginning of FY08 (10/01/2007) while achieving local and national goals to reduce energy consumption and pollutants	Asset / Materials Management	Facilities Management			No Reuse	2
23	Internal Operations	Support the purchase, upgrade and tracking of legal usage contracts for system software and applications	Systems Management	License Management			No Reuse	2
24	Internal Operations	Support the balance and allocation of memory, usage, disk space and performance on servers and their applications	Systems Management	System Resource Monitoring			No Reuse	2
25	Internal Operations	Support the propagation, installation and upgrade of written computer programs, web programs and tools, applications and components, and provide for the security and patching of all software	Systems Management	Software Distribution			No Reuse	2
26	Internal Operations	Support the identification, upgrade, allocation and replacement of physical devices, including servers and desktops, used to facilitate production and process-driven activities	Asset / Materials Management	Computers / Automation Management			No Reuse	2
27	IT Security	Develop and implement security tools, mechanisms and techniques which carry out the HECC protection model and are consistent with NASA and center standards in order to	Security Management	Identification and Authentication			No Reuse	2

		prevent unauthorized access to HECC IT resources while mitigating potential vulnerabilities and monitoring potential threats to HECC IT resources					
28	IT Security	Develop and implement security tools, mechanisms and techniques which carry out the HECC protection model and are consistent with NASA and center standards to control access to HECC IT resources, while mitigating vulnerabilities and monitoring potential threats to HECC IT resources	Security Management	Access Control		No Reuse	2
29	IT Security	Develop and implement] security tools, mechanisms and techniques which carry out the HECC protection model and are consistent with NASA and center standards to detect unauthorized intrusion attempts, while mitigating vulnerabilities and monitoring potential threats to HECC IT resources	Security Management	Intrusion Detection		No Reuse	2
30	IT Security	The HECC implements a FISMA-compliant certified and accredited/approved security plan, security infrastructure, and deploys related tools for controlling access to HEC resources and subsystems. A vulnerability assessment system utilizes security scanners to search for vulnerabilities, policy violations, and rogue network services. The HEC facility maintains 24x7 response capability and timely solution to security incidents	Security Management	Incident Response		No Reuse	2
31	IT Security	logs are centrally collected and maintained to ensure sufficient data to support audit trail capture and forensic analysis	Security Management	Audit Trail Capture and Analysis		No Reuse	2
32	IT Security	Developed a protection model and associated FISMA-compliant security plan that meets NASA security guidelines, insures that systems are certified	Security Management	Certification and Accreditation		No Reuse	2

		per NASA specification, and enhances data and system usability where specifically impacted by NASA security guidance					
33	IT Security	Working under a FISMA-compliant certified and accredited security plan to ensure the confidentiality, integrity, and availability of information systems and high-performance computing assets	Security Management	FISMA Management and Reporting		No Reuse	2
34	IT Security	All workstations will have the most up-to-date security tools installed and constantly monitored	Security Management	Virus Protection		No Reuse	2
35	Visualization & Data Analysis	Integrated visualization and data analysis to enable new science discoveries and engineering solutions	Visualization	Imagery		No Reuse	1
36	Facilities	Provide the necessary engineering and facility support required to house and sustain a major national computing asset, as well as ensure the safety of the asset and the support staff	Asset / Materials Management	Facilities Management		No Reuse	1
37	Internal Operations	Provide a framework to promote the effective collaboration between HECC and its business partners, particularly members of the distribution chain (e.g., users, other NASA organizations and partners in industry and government agencies	Customer Relationship Management	Partner Relationship Management		No Reuse	1
38	Internal Operations	Provide technical writing and editing, graphic design and manipulation, audio and video creation and editing, event planning and logistics support, website content creation and updating, and project support and coordination	Document Management	Document Revisions		No Reuse	1
39	Internal Operations	Facilitate the promotion of HECC and capture of new business	Customer Relationship Management	Sales and Marketing		No Reuse	1
40	Internal Operations	Provide property support for the identification, movement and disposal of government property	Asset / Materials Management	Property / Asset Management		No Reuse	0

5. To demonstrate how this major IT investment aligns with the FEA Technical Reference Model (TRM), please list the Service Areas, Categories, Standards, and Service Specifications supporting this IT investment.

FEA SRM Component: Service Components identified in the previous question should be entered in this column. Please enter multiple rows for FEA SRM Components supported by multiple TRM Service Specifications.

Service Specification: In the Service Specification field, Agencies should provide information on the specified technical standard or vendor product mapped to the FEA TRM Service Standard, including model or version numbers, as appropriate.

	SRM Component	Service Area	Service Category	Service Standard	Service Specification (i.e., vendor and product name)
1	Program / Project Management	Component Framework	Business Logic	Independent Platform	Custom reports based on Microsoft Office Products
2	Risk Management	Component Framework	Business Logic	Independent Platform	Custom reports based on Microsoft Office Products
3	Strategic Planning and Mgmt	Component Framework	Data Management	Reporting and Analysis	Custom reports based on Microsoft Office Products
4	Identification and Authentication	Service Access and Delivery	Service Requirements	Authentication / Single Sign-on	(RSA) SecurID, (Vendor operating system) Operating System Password required in addition to SecurID
5	Access Control	Service Access and Delivery	Service Requirements	Authentication / Single Sign-on	(RSA) SecurID, (in-house) Secure Front End for interactive access , (in-house) Secure Unattended Proxy for file transfer
6	Intrusion Detection	Component Framework	Security	Supporting Security Services	(open source snort.org) SNORT
7	Incident Response	Component Framework	Security	Supporting Security Services	NAS IT Security Team
8	Audit Trail Capture and Analysis	Component Framework	Security	Supporting Security Services	NAS IT Security Team
9	Certification and Accreditation	Service Access and Delivery	Service Requirements	Legislative / Compliance	NASA CIO Approved, FISMA-compliant IT Security Plan
10	FISMA Management and Reporting	Service Access and Delivery	Service Requirements	Legislative / Compliance	NASA CIO Approved, FISMA-compliant IT Security Plan
11	Virus Protection	Component Framework	Security	Supporting Security Services	PatchLink, Norton AntiVirus, etc.
12	Imagery	Component Framework	User Presentation / Interface	Dynamic Server-Side Display	Hyperwall (in house)
13	Imagery	Service Platform and Infrastructure	Software Engineering	Integrated Development Environment	Custom visualization S/W
14	Computer / Telephony Integration	Service Platform and Infrastructure	Hardware / Infrastructure	Wide Area Network (WAN)	NISN, NREN/NLR
15	Information Sharing	Service Platform and Infrastructure	Hardware / Infrastructure	Local Area Network (LAN)	Cisco routers/switches, Juniper routers/firewalls
16	Information Sharing	Service Access and Delivery	Service Transport	Supporting Network Services	Enhanced file-transfer techniques (e.g., BBSCP, BBFTP)
17	System Resource Monitoring	Component Framework	Data Management	Reporting and Analysis	netflow (Cisco), flowtracker (in-house)

18	Facilities Management	Component Framework	Business Logic	Independent Platform	Microsoft Office
19	License Management	Service Platform and Infrastructure	Database / Storage	Database	Sybase Database
20	System Resource Monitoring	Service Platform and Infrastructure	Software Engineering	Software Configuration Management	Nagios
21	Software Distribution	Service Platform and Infrastructure	Software Engineering	Software Configuration Management	Apple Remote Desktop
22	Computers / Automation Management	Service Platform and Infrastructure	Hardware / Infrastructure	Servers / Computers	Work stations and Laptops e.g., Apple, PogoLinux
23	Partner Relationship Management	Component Framework	User Presentation / Interface	Content Rendering	Illustrator, Photoshop, Macromediaâ€¦
24	Document Revisions	Component Framework	Business Logic	Dependent Platform	Microsoft Office
25	Sales and Marketing	Service Platform and Infrastructure	Delivery Servers	Web Servers	Microsoft Office
26	Property / Asset Management	Service Platform and Infrastructure	Database / Storage	Database	NEMS Database
27	Assistance Request	Service Access and Delivery	Access Channels	Collaboration / Communications	Phone, email, web server
28	Customer / Account Management	Service Platform and Infrastructure	Database / Storage	Database	Login Account Management System (LAMS) (in-house) software & server, HECC system, Unix workstation
29	Customer Feedback	Service Access and Delivery	Access Channels	Collaboration / Communications	Open Ticket Reporting System (OTRS) (trouble ticket management) software & server, Microsoft Office
30	Contact and Profile Management	Service Platform and Infrastructure	Database / Storage	Database	OTRS software & server, LAMS software & server
31	Surveys	Service Access and Delivery	Access Channels	Collaboration / Communications	OTRS software & server, web server, telephone, e-mail, business intelligence software, usage database
32	Scheduling	Service Access and Delivery	Access Channels	Collaboration / Communications	E-mail, telephone, HECC system, Unix workstation
33	Requirements Management	Service Access and Delivery	Access Channels	Collaboration / Communications	E-mail, telephone, Microsoft Office, business intelligence software, usage database
34	Simulation	Service Platform and Infrastructure	Hardware / Infrastructure	Network Devices / Standards	SGI Altix 3700/3700Bx2/4700, SGI ICE, IBM Power5+
35	Modeling	Service Platform and Infrastructure	Software Engineering	Integrated Development Environment	InstallTool, AIDES, Logbook (in-house)
36	Data Mining	Service Platform and Infrastructure	Database / Storage	Storage	Sun/STK Tape Silo 9310, LSI Raid, DDN 9950 RAID, Sun T1000 Tape drives, Altic 4700 system

37	Strategic Planning and Mgmt	Service Platform and Infrastructure	Software Engineering	Modeling	Analysis of performance data using tools such as Excel
38	Assistance Request	Service Platform and Infrastructure	Software Engineering	Software Configuration Management	Case-by-case profiling and tuning using tools such as profile.pl, histx, and PerfSuite
39	Assistance Request	Service Platform and Infrastructure	Software Engineering	Test Management	Case-by-case evaluation and debugging using tools such as TotalView
40	Mathematical	Service Platform and Infrastructure	Software Engineering	Software Configuration Management	Case-by-case evaluation using existing HPC platforms (such as Columbia) and applications (such as Overflow)
41	Mathematical	Service Platform and Infrastructure	Software Engineering	Modeling	Analysis of performance data using tools such as Excel
42	Mathematical	Service Platform and Infrastructure	Software Engineering	Test Management	Component and whole system profiling using NAS Parallel Benchmarks, High Performance Computing Challenge (HPCC) benchmarks, and full application codes such as Overflow, ECCO, USM3D, Cart3D, and NAMD

6. Will the application leverage existing components and/or applications across the Government (i.e., FirstGov, Pay.Gov, etc)?

yes

6.a. If yes, please describe.

HECC is not a stand-alone application, but a service being leveraged across the agency and by other federal and non-federal partners. An international community of research scientists and engineers share diverse components and software applications, including both data and programs, across the government and globally. HECC benefits users by providing a unique computational and modeling & simulation capability unavailable on regular computers, increasing user productivity through much faster turnaround of solutions to complex problems, & enabling mission work that would otherwise be impossible or impractical to solve in a timely manner. Within the TRM component framework, under security, HECC utilizes the Secure Sockets Layer (SSL) for certificates and/or digital signature. SSL is utilized for encrypted access to the Columbia supercomputer and operational support subsystems like computing & networking equipment. Two-factor identification is provided by SecureID. HECC also maintains an intrusion prevention & detection system consisting of a vulnerability assessment system and passive network monitoring system. The former utilizes 3 security scanners to probe and scan the network for vulnerabilities, policy violations, and rogue network services. Within the TRM component framework, under data interchange, HECC systems utilize standards-based local area networks (LAN) and wide area networks (WAN). The network groups of individual institutions run the LANs. Sample sites include NASA ARC, GSFC, PL, LaRC, GRC, MSFC, Lawrence Berkeley National Labs, and MIT. From these sites, the LANs interconnect with WANs, which provide network transit between local sites and the Columbia supercomputer at ARC. The HECC supercomputing environment provides the HEC capability & capacity that enables science and engineering modeling and simulation. HECC users develop information products on Columbia; and subsequently transfer these products to their individual or project databases. As a result, within the TRM component framework, under data management there is no database connectivity applicable to HECC users. Within the TRM component framework, under data presentation/interface, HECC provides project, computing system, network and security guidelines via displays. Within the TRM component framework, under business logic, the HECC systems have both platform independent and platform dependent software, protocols and methods.

PART TWO

RISK

You should perform a risk assessment during the early planning and initial concept phase of the investment's life-cycle, develop a risk-adjusted life-cycle cost estimate and a plan to eliminate, mitigate or manage risk, and be actively managing risk throughout the investment's life-cycle.

Answer the following questions to describe how you are managing investment risks.

1. Does the investment have a Risk Management Plan?

yes

1.a. If yes, what is the date of the plan?

2008-07-10

1.b. Has the Risk Management Plan been significantly changed since last year's submission to OMB?
no
3. Briefly describe how investment risks are reflected in the life cycle cost estimate and investment schedule:
Life-cycle costs include services and systems. If life-cycle costs exceed the budgeted amount, HECC will no longer meets its price/performance goals. In the extreme cases, system reliability and accessibility can degrade. HECC controls service life-cycle cost risks by using competitive service acquisitions, monitoring contractor performance, and using past performance evaluations to motivate cost control. System life-cycle cost risks are controlled by the use of competitive evaluations and acquisitions and by including long-term maintenance costs in the competitive system proposal cost evaluations. Competitive acquisition cost evaluations include long-term maintenance costs, contract performance monitoring, and reporting. Significant risks are continually identified, with responsibilities for minimizing them clearly established as part of an effective, ongoing risk management process as documented in HECC's Risk Management Plan. Further, a portion of the HECC budget is being used for development, modernization and enhancement during FY 2006-2010. When the investment involves extensive development activities, the cost estimates will be based on the best knowledge of the requirements, and contingencies will be held commensurate with risk and uncertainty. In the evaluation of alternative approaches to HECC, the risks have been taken into account in analyzing costs and making decisions on which approach to use.

COST & SCHEDULE

1. Does the earned value management system meet the criteria in ANSI/EIA Standard 748?
yes
2. Is the CV% or SV% greater than ± 10%?
no
3. Has the investment re-baselined during the past fiscal year?
yes
3.a. If yes, when was it approved by the agency head?
2008-06-19